are the Inns of Court. From the date of the foundation of the first college our knowledge becomes more definite. The original statutes have been preserved, and were published to the world by the University Commissioners about twenty years ago. The evidence, therefore, of the intentions of the early founders of fellowships is abundant, and it is also decisively clear. It was, no doubt, desired that the study of Theology should be supreme, and ample provision was made for divine worship; but it must be recollected that in those days Theology included Law, and did not exclude Natural Philosophy. But what the founders had foremost in view, as might easily be shown by copious extracts from their statutes, was not religion, or even education, but advanced study. The few earliest colleges make no reference at all to the endowment of teaching. Their fellowships were established "for the support of indigent scholars in the University of Oxford, who are bound to study and make progress in the divers Sciences and Faculties." The function of teaching was left to be performed by the University, and all those who had taken the higher degrees enjoyed the privilege, as they were under the obligation, of giving instruction. "To study, not to teach, was the business of the Fellows. The founder of Queen's College has even expressly stated that he intends his benefaction to relieve his Fellows from the necessity of teaching." The full period of study required for the degree of Doctor lasted for thirteen or nineteen years, varying in the different faculties; and the fellowships were intended to support poor students during this long season of probation. Nor must it be supposed that Theology and the Classics were the only subjects meant to be encouraged. Many of the founders made provision for the study of medicine; at New College Astronomy is specially mentioned; and William of Waynflete, in the statutes of Magdalen, expressly prescribes Natural Philosophy as one of the three departments of knowledge which the Fellows were to cultivate. Other instances of a similar nature might be quoted; but nothing further is required to prove what the colleges themselves will scarcely admit, that the fellowships were given not as prizes to stimulate clever boys, nor as subsidies for academical teachers, but to promote mature study. The appeal, therefore, to the intentions of the founder does not lie in the mouth of the advocates of the existing order of things, but is one of the strongest arguments that can be used by those who support the endowment of research, which turns out to be merely the restoration of the old practice.

MINERALS OF NEW SOUTH WALES

Mines and Mineral Statistics of New South Wales. Compiled under the direction of the Hon. John Lucas, M.P.; also "Remarks on the Sedimentary Formations of New South Wales." By the Rev. W. B. Clarke, M.A., F.G.S. (Sydney, 1875.)

THE volume now before us is a companion to that we reviewed recently in this journal on the minerals and rocks of Victoria,[*] and like it has been called forth by the necessity of cataloguing and describing the collection of specimens exhibited at the Metropolitan Intercolonial Exhibition held at Sydney in 1875, which consisted of rock-specimens, fossils, samples of coal, ores of iron, and other metals, collected by the Examiner of Coal-fields, the Government Geologists, and furnished to a large extent by the owners of mines, the whole being arranged by Mr. C. S. Wilkinson, Government Geologist to the colony. The volume also contains statistics of the minerals raised in 1874 and preceding years. These do not pretend to be more than approximations, but they are sufficient to enable us to see the strides this great colony is making in the development of those mineral treasures which are almost lavishly bestowed throughout the area already explored, and which give promise of still wider distribution; meanwhile, the authorities seem fully alive to the importance of having accurate returns. It is stated that "the arrangements for the future are such as it is hoped will secure the collection, publication, and preservation of complete and authentic returns, and no pains will be spared to render our records of the past more complete than they are at present."

It may interest our readers, however, to be put in possession of the latest returns, which are for the year 1874, and are as follows:—

	Total Value.
Gold	£30,656,246
Coal	6,565,328
Tin	866,461
Copper	807,476
Oil-shale (Kerosine)	261,414
Silver	77,216
Iron	15,434
Antimony	897
Total	£39,220,472

It is impossible to rise from a perusal of this volume without the conviction that the resources in not only the precious metals, but the more useful minerals—coal and iron—are practically inexhaustible, and that being developed by British colonists are destined, or are at least calculated, to produce a nation rivalling the mother-country in manufacturing industry. We gather that the colonists now fully perceive this themselves; and for this they are to no small degree indebted to the voluntary labours of that veteran geologist, the Rev. W. B. Clarke, who for a quarter of a century has been engaged in exploring the interior of the continent and unfolding its geological structure. A more detailed survey is now in progress, which has been attended with highly encouraging results; and it would be well for intending settlers to possess themselves of all the available information afforded by the maps and reports of the geological surveyors, as by this means they may become the happy possessors of treasures lying below the surface. Meanwhile, sufficient is known to enable us to give a short sketch of the physical features and geological structure of this great colony.

New South Wales is bounded on the south by the Murray River—separating it from Victoria—and on the north by a line generally corresponding to the 29th parallel, by which it is separated from Queensland.

The coast line extends from Cape Howe to Point Danger, a distance of nearly 700 miles, with the Ports of Wollongong, Sydney, Newcastle, and the Clarence River at intervals. At a distance from the coast-line, varying

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[*] "Rocks and Minerals in the Melbourne Museum," NATURE, vol. xiii. p. 165.

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from 30 to 150 miles, runs the Cordilleras range of mountains—sometimes serrated, at others tabulated—and reaching elevations of 6,000 or 7,000 feet. "The highest point in all Australia," is at the head of the Murray River and near the boundary with Victoria, being, according to Strzelecki, 6,500 feet above the sea, but according to the later observations of Clarke 7,175 feet. From the base of this range the country extends in a spacious plain to the sea margin, and on the west into the great central wilds of South Australia, and the regions watered by the Darling, the Lachlan, and the Murrumbidgee Rivers. The central tract from the coast to the Cordilleras is occupied by the Sydney coal-field, having a sea-board of about 200 miles, and an area of over 15,400 square miles—as estimated by Mr. J. Mackenzie, F.G.S., Examiner of the Coal-fields—richly stored with coal, and, along its western margin, with iron. Newcastle in Australia is a coal-shipping port, as well as the Newcastle in the old country, and from the number of projected lines of railway communicating with it, it is clear that the neighbouring collieries are destined to distribute mineral fuel into the far interior, as well as to the ocean steamers and coast towns.

Another point of similarity between the mother-country and her daughter, dates from the far-off ages of Geologic time; for Mr. Clarke and other geologists have clearly demonstrated that the coal-beds of New South Wales and of Britain were elaborated in Nature's workshop during the same Geological period; and on comparison it will be found that the general succession of the members of the Carboniferous series in the North of England and Scotland have their equivalents, as nearly as possible, at the Antipodes. This may be accidental, but it is at any rate a striking illustration of the prevalence of similar conditions over wide areas of the globe during the Carboniferous period.

The general succession of the Upper Palæozoic series of New South Wales and their possible British representatives is as follows:—

NEW SOUTH WALES.	GREAT BRITAIN.
(*e*) *Wianamatta Series.*—Shales, with fish (*Palæoniscus*), fresh-water shells, and plants. 500 feet.	(*e*) Possibly Permian Beds.
(*d*) *Hawkesbury Series.*—Chiefly sandstones, with ferns (*Glossopteris browniana*). 1,000 feet.	(*d*) Upper Red Sandstone of the Glasgow district.
(*c*) Upper Coal-measures of Newcastle, &c., with plants—as *Glossopteris*, *Sphenopteris*, Conifers—with sixteen coal-seams over three feet in thickness. 480 feet.	(*c*) Upper coal-measures of Scotland, with Millstone Series at base.
(*b*) *Upper Marine Beds.*—Shales, sandstones with coal-seams, &c., with numerous Lower Carboniferous shells (*Spiriferæ*, *Producti*, Crinoidal stems. 350 feet. *Lower Coal-measures.*—Shales, sandstones with similar fossils. 100 feet.	(*b*) Lower coal-measures of Scotland of the Carboniferous Limestone age.
(*a*) *Lepidodendron Beds.*—Shales and sandstones, with Carboniferous plants (*Cycloptoris*, *Knorria*, *Sigillaria*, *Lepidodendron*) resting unconformably in Devonian beds.	(*a*) Calciferous Grit Series.

Though Prof. M'Coy considers, on palæontological grounds, that the upper beds of the above series may be of Mesozoic age, we are unable to concur in that view, and consider Mr. Clarke's demonstration of their Palæozoic age conclusive. The whole series, with the exception of the Wianamatta shales, are conformable throughout, and the differences in the flora and fauna between the Upper and Lower series are not greater than those between the Upper and Lower Carboniferous beds of Great Britain.

The quantity of coal raised in 1874 amounted to 1,304,567 tons, and the returns of the out-put since 1829 show a steady annual increase. The demand in the future is likely to exceed the supply; but collieries are being rapidly opened up where means of transport to the markets are available.

Amongst the most valuable products of the coal-fields are the "Kerosine shales," a kind of oil-shale or cannel, of which 96,141 tons were raised in 1874 from three mines. These beds resemble the oil-cannel of Torbane Hill in Scotland, and the associated shales from which the celebrated paraffin oil is extracted. Some of these seams are exceedingly rich, and are used for the production both of petroleum and gas. Beds of clay-ironstone, besides large veins and masses of brown hæmatite, occur towards the base of the Carboniferous rocks in several places, amongst which those of Wallerawang are likely to become of the highest importance. A detailed account of the various ores has been drawn up by Prof. Liversidge, accompanied by chemical analyses, which show that the ores are rich, containing from 40 to 56 per cent. of metallic iron. Other iron-producing works have been established at Lithgow Valley and Berrinia, but space forbids fuller reference. For the accounts of the gold, silver, and precious stones, including the diamonds of Inverell and Armidale, we must refer to the pages of the book itself, which, though full from cover to cover of valuable information, suffers much from the want of a good index.

OUR BOOK SHELF

Geological Sketches. By L. Agassiz. Second Series. 8vo. pp. 229. (Boston, James R. Osgood and Co.; London, Trübner. 1876.)

NO better idea can be given of this little book than is obtained from the first few words of the preface. "This edition of the 'Geological Sketches' offers nothing new to the public. Taken in connection with the former one, it only presents in a permanent form and in their original sequence all the geological and glacial papers contributed by Prof. Agassiz to the *Atlantic Monthly* during a number of years." It consists, in fact, of five chatty papers on glacial phenomena in various parts of the world, written in that kind of personal manner that makes them read like a book of travels or a chapter of an autobiography. It is perhaps chiefly from this latter point of view that this collection is interesting. Whatever may be Agassiz's position with respect to the interpretation of the phenomena of recent glaciers, there can be no question but that to him is due the first recognition of their former existence and extent in this country and elsewhere where they now no longer exist. From the day of that discovery in 1840, "Glacial Geology," now a department by itself, has been steadily growing, till investigations into the work of ice has been carried into almost every part of the globe, not excluding the Tropics. Agassiz has therefore a fair right to the title of Father of Glacial Geology. He gives us here an interesting sketch of his first opening up this ground by his visit to Scotland, and puts in a popular

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